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ABSTRACT

An exploratory study examined the premise that pets provide developmental benefits for young children. Four hypotheses were derived from prior research: (1) children who have a bond with a dog or cat show more maturity in their cognitive, moral, and emotional development than children who do not have such pets; (2) children who have a more interactive relationship with their pet are more affected by that relationship than those with a more distant relationship; (3) family environments which include dogs or cats facilitate children's development more than those without pets; and (4) a pet's effects on a child are directly affected by family relationships. Survey data from 88 parents about themselves, their homes, and their preschool children provided empirical support for the hypotheses. Additional data from home interviews with some families provided further support for the general premise that pets provide developmental benefits for young children. Benefits were primarily in the children's social domain, and involved social competence, empathy, and attitudes toward pets. Effects on cognitive development were marginal. "Pet bonding" appeared to be a stronger determinant of pet-associated benefits than pet ownership. Children with pets and better home environments had higher age-adjusted child development scores. Over 40 references are cited. (Author/RH)

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Report to The Delta Society

Developmental Benefits of Pets for Young Children

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Developmental Benefits of Pets for Young Children

Abstract

An exploratory study was conducted to examine the general premise that there are developmental benefits of pets for young children. Four hypotheses were derived from prior research by the authors and other scientists and therapists:

1. Children who have a bond with a dog or cat show more maturity in their cognitive, moral and emotional development (e.g., decentration, responsibility, self-concept, empathy, attachment) than children who do not have such pets.

2. Children who have a more interactive relationship with their pet are more affected by that relationship than those with a more distant relationship.

3. Family environments which include dogs or cats facilitate children's development more than those without pets.

4. Companion animal effects on a child are directly affected by family relationships.

Survey data from 88 parents about themselves, their homes, and their preschool age children provided empirical support for the hypotheses. Additional data from home interviews with some of the families provided further support to the general premise that there are developmental benefits of pets for young children. The benefits were primarily, but not exclusively, in the children's social domain including their social competence, empathy, and pet attitudes. The effects on cognitive development were marginal. "Pet bonding" appeared to be a stronger determinant of the pet associated benefits than "pet ownership." Other family elements including the Environmental Assessment Index measure of the quality of their home environments and scales of the spousal Relationship Inventory were associated with both "pet ownership / bonding" and the children's development. Children with pets and children with better home environments had higher age-adjusted child development scores. Further research to replicate these results and clarify their complex linkage is recommended.

Developmental Benefits of Pets for Young Children

Research Report

Introduction

The effects of pets, primarily dogs and cats, on human development has received renewed interest recently. This report includes a review of the literature which suggests a limited impact of pets on young children; ecological (family/home) factors which may interact with the bonding process as it affects children's cognitive, social and emotional development; and, the difficulties in prior research which cloud the evidence of the impact of dogs and cats on young children's development. Four hypotheses were generated from the review and two linked studies were conducted to clarify the impact of companion animal bonds on young children's development. This research focuses on the effect of child - pet bonding, rather than just "pet ownership" or mutual cohabitation, on young children in a family context. The first study was a parent questionnaire survey of children's involvement with pets and the effects of this involvement on the children and the families. The second study was an in-home study of three- to six-year-old children and their families in homes which have and don't have dogs or cats.

Literature Review

A general discussion of animal companions was provided by both Levinson (1982) and Kellert & Westervelt (1982) appearing in the International Journal for the Study of Animal Problems. The Summer, 1985, Marriage and Family Review was dedicated to review papers on pet effects. Recent papers have focused on the need for tighter research on both the bonding process and its effects across the life span. In their review Robin and ten Bensel (1985) said, "there is very little analysis of the role of pets in child development" (p. 63).

There are a number of arguments for the importance of the child-animal bond. Levinson concluded that "closeness to animals can reduce alienation" (1978, abst), based upon the argument that people and companion animals evolved together over thousands of generations. Levinson said children's empathy, self-esteem, self-control and autonomy could be promoted by raising pets. This argument was not restricted to children, but Levinson said people of all ages would benefit from nurturing animals. More recently, Frith (1982) described a powerful role for animal companions when he suggested that pets for handicapped children can provide social, emotional and recreational benefits. He recommended

careful selection of the pet and cautioned that the developmental status of the child and the home environment considered in adopting a pet for a handicapped child. The recent Horn and Meer (1984) survey, albeit confounded by demographic differences between owners and nonowners and other methodological concerns, found that pet owners were happier than those who do not own pets. "Pleasure or companionship" was the overwhelming reason given for pet ownership. Approximately 90% of the respondents had pets as children and they felt pets were important for children.

The relationship between pet ownership and children's self-esteem, social sensitivity and interpersonal trust was explored by Hyde, Kurdek and Larson (1983). They found pet owners to be higher on measures of social sensitivity and interpersonal trust than non-owners. Covert, Whiren, Keith, and Nelson (1985) found a low magnitude (r =.11) correlation between pet ownership and young adolescents' self-esteem. These are two of the few such studies and the studies' lack of distinction between "pet ownership" and companion animal bonding may be why they found only low magnitude effects. Other studies suggest more promising results.

The effect of an animal on children's blood pressure was noted by Friedmann (1983). The presence of a dog during the experiment was associated with lowered blood pressure in children 9-16 years old. The effect was suggested to be due to the presence of the dog alleviating the children's perceptions of the threat of the experimental situation. Wolfe (1977) found that adolescents' use of pets as "transitional objects" provided them consolation and reduced their stress. Wolfe said the pets also expedited adaptation to traumatic events in their lives.

MacDonald (1979) reviewed the relationship between animals and children and suggested the use of companion animals as aids in child psychotherapy. He illustrated the significant role of pets with the case study of a 9-year-old girl who had been in analysis for three years. Salomon (1982) also suggested pets help children's re-education and psychotherapy by assisting them in their expression of conscious desires and by their companionship. Children between 6 and 13 years of age perceived animals as signs of love and security or as symbols of liberty and independence depending on their age group. The effects of animals on children depends on their attitudes toward animals which depends on the children's socialization and age. Similarly, Sherick (1981) cited the role of pets in a girl's unconscious expression of her difficulties and as a symbolic substitution for her ideal self. Similar value for the use of animal images to aid in therapeutic communication is reported by Camppo and Vilar (1977). Levinson (1966) also recommended the use of animals in psychodiagnosis and diagnostic play interviews with children.

Adults' self concepts, which are an index of mental health, have been linked to their companion animal bonds. In contrast to some expectations that "pet ownership" would be a factor in adults' self concepts, Poresky, Hendrix, Mosier and Samuelson (in press) found that the age when children had pets was significantly related to their self concept scores on the Tennessee Self Concept Scale. Those children who had their most important in early childhood or in adolescence had higher self concept scores than those who had their most important pet during middle childhood.

Serpell (1981) found evidence that adult's experience with pets affected their adult attitudes. More recently Poresky, Hendrix, Mosier and Samuelson (1988) reported a stronger linkage between adults' pet attitudes and their childhood companion animal bond than their more contemporary experiences. Pet attitudes were assessed by the Companion Animal Semantic Differential (Poresky, Hendrix, Mosier and Samuelson; in press) and the human-animal bond was assessed with the Companion Animal Bonding Scale (Poresky, Hendrix, Mosier and Samuelson; 1987).

There are few studies which discuss the development of children's attitudes regarding animals (Salomon, 1983). Wolfe (1977) noted adolescents' perception of pets as being gentle, warm, consistent, sympathetic and empathic. Kellert (undated) has also described some developmental changes in children's affective, emotional attitudes between 6 and 9 years of age and in their cognitive (intellectual) understanding of animals between 10 and 13 years. Ethical concerns for the animals' ecological system broadened between 13 and 16 years of age, illustrating the developmental aspects of child-animal relationships. These developmental factors generally interact with ecological factors of the child's home environment.

The quality of children's home environments, including the presence of animals, has been linked with both the concurrent and longitudinal cognitive development of preschool children (Bradley and Caldwell, 1984; Poresky and Henderson, 1982; Poresky, 1984; Poresky, 1987). Poresky (1984) also reported a similar link between the children's home environments and the intellectual development of older children. Poresky and Earle (1986) found a positive correlation between school-age children's home environments and measures of their social development. Their "Leader" social competency rating was positively correlated with their home environment assessment index and their "Apprehensive" rating was inversely correlated with the index. Children's home environment measures often include the presence of a pet. Children's bonding with pets would also be likely to be positively correlated with measures of intellectual development. These aspects of child development are relevant to the children's emotional and moral development and would likely be also

associated with children's development of bonds with their dog or cat. Thus companion animal effects on young children should be examined within the context of their family/home environments.

The age-related developmental effects of events in children's lives are illustrated by a series of studies by Tizard. Although Tizard's early research did not find children's early environments to impair their cognitive development, her later research reports indicated major effects of events in the lives of young children which persisted for many years thereafter (Tizard & Rees, 1974; Tizard & Hodges, 1978). These studies coupled with the importance of the early years in the psychoanalytic and the developmental literature highlight the importance of studying the effects of pet bonding during children's formative early years.

Robin and ten Bensel (1985) compared the pet histories of teen-agers in juvenile institutions with non-institutionalized youth. Both groups had a high rate of prior pet ownership and there was no difference in the "pet ownership" rates between the groups. They concluded that, "Merely having a special pet played no part in whether or not a child was eventually institutionalized" (p. 75). Thus future research must focus on the effects of bonding rather than just "having a special pet."

IMPLICATIONS FOR CHILD-ANIMAL BONDING RESEARCH

There is a dearth of empirical research on the role of dogs/cats in child development, but due to the development of needed instruments the feasibility of conducting focused research on child-pet bonding is enhanced. Katcher concluded in his 1984 paper that, "controlled studies demonstrate no effects or effects which could be accounted for by experimenter bias, novelty, or the presence of additional social contact with the human being accompanying the animals" (p.34). With increased knowledge of factors affecting children's cognitive, social and emotional development and an awareness of the cautions cited by Katcher, the stage is now set for more focused research in children's natural home environments where many extraneous influences introduced by laboratory settings may be avoided.

Two key elements have been imprecisely defined in prior research: bonding and children. While "pet ownership" has often been the operational definition of child-animal bonding, the key factor should be the quality of the relationship or interaction between the pet and child. Another significant factor is the child's developmental stage which affects both the pattern of important ecological influences and the child's adaptation to environmental influences. This research also considers the effect of a pet on the family.

Two key factors for this research on young children's

companion animal bonding were (1) reaching beyond "pet ownership" to child-pet interactions (relationships) and (2) analyzing the effects within the home/family context along with the effect of a pet on the family. These essential considerations are reflected in the research hypotheses:

Hypotheses:

1. Children who have a bond with a dog or cat show more maturity in their cognitive, moral and emotional development (e.g., decentration, responsibility, self-concept, empathy, attachment) than children who do not have such pets.

2. Children who have a more interactive relationship with their pet are more affected by that relationship than those with a more distant relationship.

3. Family environments which include dogs or cats facilitate children's development more than those without pets.

4. Companion animal effects on a child are directly affected by family relationships.

Method

Instruments

The questionnaire study asked parents of young children about their children's relationship with pets (dogs/cats). The parents were asked to describe their preschool children's: (a) age when they had their pet(s), (b) attitudes toward pets, (c) interaction with their pets, (d) home environment, and (d) family relationships. The parents were also asked to describe their children's cognitive development and social competence. Their responses are presented in the next section.

A survey was developed and distributed which included the instruments to assess the primary variables and to provide basic demographic and historical information. The pet relationship scales included: (1) the Companion Animal Bonding Scale (Poresky, Hendrix, Mosier, Samuelson; 1987) for the parents to describe both their childhood child-pet interactions and their children's child-pet interactions, and (2) the Companion Animal Semantic Differential (Poresky, Hendrix, Mosier, Samuelson; in press) to assess both the parents' pet attitudes and their children's pet attitudes. These are the key measures of the human-animal bond.

The family environment scales included: (1) the Environmental Assessment Index (Poresky, 1987) which was adapted for the mothers and fathers to use to describe the developmental quality of their homes, (2) the abbreviated Relationship Inventory (Schumm, Jurich, & Bollman, 1980; Schumm, Benigas, McCutchen, Griffin, Anderson, Morris & Race, 1983), and (3) the Kansas Marital Satisfaction Scale (Schumm, Paff-Bergen, Hatch, Obiorah, Copeland, Meens, & Bugaighis, 1986). These measures were included for testing hypotheses three and four.

The parent survey child development measures included a general measure of child development and specific measures of social development. The Denver Prescreening Developmental Questionnaire (Frankenburg, 1975) was adapted and extended to assess child development with the age markers removed. To assess the children's social development the Iowa Social Competency Scales were included. Based on the fathers' and mothers' ratings the scales yield the following social competency scores: cooperative, uncooperative, attentive, social activator, socially inapt, hypersensitive, and reassurance. Data on the reliability and validity of the Iowa Social Competency Scales is presented in Pease, Clark and Crase (1981).

During the home visits additional child development and home environment data was collected. The Peabody Picture Vocabulary Test (Dunn and Dunn, 1981) and unobtrustive measures of helping

and empathy were administered. Empathy is often discussed in the psychological literature under the heading of "perspective taking" which is part of the larger domain of "prosocial behavior." Barnett (1984) said empathy includes both affective and cognitive perspective taking. We created brief verbal vignettes with affective and cognitive probes to assess the children's empathy. Helping was assessed with an adaptation of "helping behaviors" by Rheingold (1982). The children's cooperation was also rated by the home visitor.

Sample Selection

Parents of young children were contacted through a number of sources. The names of parents with children of the appropriate age (3 to 6 years) were drawn from birth announcements and checked against the telephone book to verify their present address. Family mobility reduced the initial list considerably. Families were also contacted through the early childhood unit at Kansas State University, which operates the Early Childhood Laboratory and the Stone House Child Care Center, as well as families associated with the Blue Valley Nursery School, the K.S.U. Child Care Cooperative and the Manhattan Day Care centers. Newspaper and radio publicity led to further contacts. The 27-page questionnaires were sent to 305 addresses and 73 were returned for the first study and 15 additional responses were received during the home visit study.. The distribution of the mailing and the total parent survey responses is shown below.

Questionnaire Distribution and Responses

Source	# Mailed	# Returned	% Returned
Volunteers	19	14	74%
Early childhood lab	40	11	28%
Stone House day care	24	13	54%
Nursery school	32	5	16%
Birth announcements	77	17	22%
Low income day care	43	5	12%
Cooperative childcare	70	23	33%
TOTAL	305	88	29%

The children represented in the returned questionnaires ranged from 3 to 6 years old with equal numbers of boys and girls. They had an average of one sibling according to their mothers' reports. Two-thirds of the children were first born children. The mothers' average age was about 34 years and their fathers' average age was about 35 years. The sample was well educated with

68% of the mothers and 81% of the fathers having a bachelor's degree. The families' gross annual income was estimated by the mothers at about $30,600 (SD = $17,500). Most of the families were two-parent families. The children's residences were equally distributed between urban, suburban and rural home settings with 74% living in single family homes and 14% in apartments. The sample was predominantly White with 94% of the mothers and 93% of the fathers characterizing themselves as "White". Most of the children had some non-parental care and group experience.

Demographic Characteristics of the Sample
Age in Years

Family member	Mean	Std. Dev.	Min.	Max.
Children's' Age (years)	4.26	0.95	3	6
Mothers' Age (years)	34.09	5.68	21	49
Fathers' Age (years)	35.32	5.44	22	46

Educational Characteristics
Highest Educational Level Completed

	High School	College	B.S./B.A.	M.S.	Ph.D.
Mothers	8%	23%	36%	19%	13%
Fathers	7%	12%	24%	26%	31%

Mothers' and Fathers' Family Structure

	--- Respondent --	
Family Type	Mothers	Fathers
Two-parent family		
- original marriage	78%	98%
- remarriages	5%	2%
Single-parent family	17%	

Children's Early Childhood Experiences

Experience	Per cent
Day Care	58%
Preschool	66%
Nursery School	13%
Kindergarten	11%

Descriptive Results

The mothers' and fathers' survey data presentation includes , in order, their descriptions of their own childhood pet interactions, their home and family descriptions and their ratings of their children's development. The home visit data including measures of the families' home environments and the children's development follows the parental reports.

Mothers and their Childhood Pets

The children's mothers were asked to describe their childhood pet experiences. They reported having about 3 pets during their childhood (M = 2.9, SD = 1.8 pets) with an average of 1.6 dogs and 0.8 cats. Seventy percent noted their most important pet was a dog and 14% listed a cat. The mothers began living with their "most important" childhood pet at about 9 1/2 years (M = 9.52 years, SD = 6.29 years) and lived with the pet for about 7.5 years (7.46 years, SD = 3.69 years). Only 10% of these pets are still alive and 6% are living with them. Their childhood Companion Animal Bonding Scale scores are summarized in the next table.

Mothers' Interactions with their Most Important Childhood Pet
Companion Animal Bonding Scale
Percent Distribution
(n = 75)

	Frequency				
Item	Always	Generally	Often	Rarely	Never
1. Responsible for pet's care	24	24	29	17	5
2. Clean up after animal	16	19	26	23	11
3. Hold, stroke or pet animal	37	31	24	4	0
4. Animal sleeps in your room	13	15	8	23	41
5. Feel animal was responsive	67	19	13	0	0
6. Feel a close relationship	53	27	17	1	0
7. Travel with companion animal	5	8	7	36	43
8. Sleep near companion animal	11	17	8	32	32

The behavioral Companion Animal Bonding Scale items are summarized by the full scale score and the involvement factor score shown below. These scores reflect the mothers' relationship or bonding with their most important childhood pet.

Mothers' Interactions with their Most Important Childhood Pet
Companion Animal Bonding Scale Summary

Scale	Mean	SD	Minimum	Maximum
Full Scale	26.34	5.61	16	40
Involvement Factor	0.04	2.75	-5.39	5.79

The bonding scores above reflect the mothers' interaction with a pet during their childhood. The behavioral items which are summarized in the above table indicate the wide range of bonding activities of the mother with their most important pet animal.

The table below reflects the mothers' attitudes about, as distinct from her interaction with, her most important childhood pet.

Mothers' Attitudes toward their Most Important Childhood Pet
Companion Animal Semantic Differential
(Percent Distribution)
n = 72

	Positive				Negative		Mean	Standard
Word-Pair	6	5	4	3	2	1		Deviation
Bad / Good *	82	14	0	4	0	0	5.78	0.51
Not loving / Loving *	79	14	6	1	0	0	5.71	0.64
Friendly / Not friendly	69	21	3	3	4	1	5.42	0.92
Cuddly / Not cuddly	47	24	14	14	0	0	4.93	1.35
Cold / Warm *	63	25	10	3	0	0	5.48	0.78
Pleasant / Unpleasant	69	21	7	3	1	0	5.52	0.85
Kind / Cruel	66	27	6	1	0	0	5.58	0.67
Bitter / Sweet *	56	30	10	4	0	0	5.38	0.83
Distant / Close *	62	23	12	3	0	0	5.45	0.81

* = reversed item.

This scale yields a total score and a factor score. The primary semantic differential factor was the evaluative factor which is listed below. The mothers' attitude toward their own most important childhood pets is summarized in the next table.

Mothers' Attitudes toward their Own Childhood Most Important Pet
Companion Animal Semantic Differential

Summary Scores

Score	Mean	Standard Deviation
Total Score	49.29	5.19
Evaluative Factor	1.10	3.86

Mothers' Ratings of their Children's Home Environments

The mothers were asked to complete the survey form of the Environmental Assessment Index (EAI) (Poresky, 1987) as a self-report evaluation of the quality of their homes. Each item on the 23-item instrument was rated on a five-point scale ranging from "No items, never present or happens" (1) to "vast items, always present or happens" (5). Average EAI scores were calculated for each respondent. The individual average maternal EAI scores for the 23 items ranged from 3.26 to 4.52 on the five-point scale. The mothers' ratings averaged 4.01 (SD = 0.27).

Mothers' Family Relationships

The mothers and fathers were asked to rate their relationship with their child and their spouse on a 1 to 9 scale ranging from "Very poorly" (1) to "Very Well" (9). The mothers' rated their relationship with their husbands above "well" and their relationship with their child almost at "Very Well".

Mothers' Family Relationships

With their...	Mean	Standard Deviation
Husband	7.82	1.83
Child	8.31	0.95

The 15-item relationship inventory (Schumm, et al; 1980) scale was completed by the mothers. Each of the items is rated on a five-point scale ranging from "Strongly Disagree" to "Strongly Agree". This scale yields scores on three factors: congruence, empathy and regard.

Mothers' Relationship Inventory Results

Scale	Mean	SD
Congruence	21.07	2.99
Empathy	18.83	2.86
Regard	22.46	2.89

Mothers' Marital Satisfaction

The three items on the Kansas Marital Satisfaction Scale (Schumm, et al.; 1986) were rated by the mothers on a 7-point scale ranging from "Extremely Dissatisfied" (1) to "Extremely Satisfied" (7). The mothers' responses to these three questions is given in the next table.

Mothers' Marital Satisfaction

Question	Mean	Standard Deviation
How Satisfied are your with your...		
1. ... marriage?	5.86	1.49
2. ... relationship with your husband?	5.69	1.43
3. ... husband as a spouse?	5.83	1.55
Total Score	17.12	4.40

Children's Pets - Maternal Report

The children's mothers noted an average of 1.58 pets (SD = 1.84) for their contemporary households. These included an average of 0.57 dogs and 0.74 cats. Forty of the mothers listed most important pets for their child including 21 dogs and 19 cats. The mothers' reports of the 2 - 6 year old children's interactions with their pets on the Companion Animal Bonding Scale is shown in the next table. The CABS has eight items which were rated by the mothers as occurring either Always, Generally, Often, Rarely or Never.

Children's Companion Animal Bonding
Companion Animal Bonding Scale
Itemized Responses
(Percent Distribution)
Maternal Report
n = 44

Item	Always	Generally	Often	Rarely	Never
1. Responsible for pet's care	2	9	6	57	26
2. Clean up after animal	0	2	9	36	52
3. Hold, stroke or pet animal	16	20	45	8	10
4. Animal sleeps in your room	7	4	17	15	56
5. Feel animal was responsive	18	22	41	8	8
6. Feel a close relationship	17	29	37	10	6
7. Travel with companion animal	4	4	9	36	47
8. Sleep near companion animal	6	4	11	30	49

Children's Companion Animal Bonding
Companion Animal Bonding Scale
Summary
Maternal Report

Scale	Mean	SD	Minimum	Maximum
Full Scale	20.15	5.48	9.00	36.00
Involvement Factor	-3.35	3.04	-9.77	4.49

The mothers' attitudes toward their child's pets is reflected in the Companion Animal Semantic Differential. This use of the scale reflects how the children's mother feel about the pet they judge to be most important to the child they focused on for this survey. This semantic differential has nine word-pairs with a six-point scale between the words. The mother was asked to place a mark between the words which describes her feeling about the animal. Five of the items were reversed to control for a response bias and all were converted to a code with 6 indicating a positive attitude. Please see the next table.

Mothers' Attitudes toward the Child's Most Important Pet
Companion Animal Semantic Differential
(Percent Distribution)
n = 49

	Positive				Negative		Mean	Standard
Word-Pair	6	5	4	3	2	1		Deviation
Bad / Good *	63	22	10	2	0	2	5.41	1.00
Not loving / Loving *	60	21	10	4	4	0	5.29	1.09
Friendly / Not friendly	62	20	12	4	2	0	5.36	0.99
Cuddly / Not cuddly	43	16	22	8	6	4	4.69	1.47
Cold / Warm *	49	20	22	6	2	0	5.08	1.08
Pleasant / Unpleasant	51	27	16	4	2	0	5.20	1.00
Kind / Cruel	51	33	14	2	0	0	5.33	0.80
Bitter / Sweet *	43	29	4	22	0	0	5.06	1.01
Distant / Close *	39	22	10	22	0	0	4.73	1.35

* = reversed item.

This scale yields a total score and a factor score. The mothers' attitudes toward their children's most important pet is summarized by these summary scores shown in the next table.

Mothers' Attitudes toward the Child's Most Important Pet
Companion Animal Semantic Differential
Summary Scores

Score	Mean	Standard Deviation
Total Score	44.69	6.28
Evaluative Factor	-2.57	4.71

Father Source Information

The children's fathers were also asked many questions about their childhood experience with pets and their perceptions of the target child and his/her interactions with a pet, if any. Since the demographic and child information was more complete from the mothers, the demographic and child information from the fathers will not be presented here.

Fathers' Childhood Pet Background

Fifty-five fathers noted that they had pets during their childhood. They listed 2.4 pets (SD = 1.5 pets) which included 1.6 dogs (SD = 1.1 dogs) and 0.46 cats (SD = 0.99 cats). Eighty-two percent of the fathers listed a dog as their most important pet and 8% listed a cat. They said they acquired their most important pet between birth and 50 years of age (M = 8.5 years, SD = 8.06 years) and that they lived with the pet for 2 to 16 years (M = 7.9 years (SD = 3.96 years). Ninety percent of these pets are reported to be still alive.

The fathers' responses to the Companion Animal Bonding Scale describe some of their interactions with their most important childhood pet. Each of the eight items was checking on a five-point frequency of occurrence scale ranging from "Always" to "Never" and their responses are noted below in the next table.

Fathers' Childhood Pet Interactions
Companion Animal Bonding Scale
Percent Distribution
(n = 53)

	Frequency				
Item	Always	Generally	Often	Rarely	Never
1. Responsible for pet's care	8	23	40	25	6
2. Clean up after animal	10	19	29	35	8
3. Hold, stroke or pet animal	27	37	33	4	0
4. Animal sleep in your room	6	11	13	21	49
5. Feel animal was responsive	42	45	11	2	0
6. Feel a close relationship	36	42	19	4	0
7. Travel with companion animal	4	9	17	26	43
8. Sleep near companion animal	6	10	14	29	42

The fathers' childhood Companion Animal Bonding Scale summary statistics include the total score and the involvement factor score. These are presented in the next table.

Fathers' Childhood Companion Animal Bonding Scale
Summary Statistics

Statistic	Mean	Standard Deviation
Total Score	24.32	5.35
Involvement factor	-1.09	2.63

The fathers were also asked about their attitudes toward the pet which was most important for them during their childhood. Their responses to the Companion Animal Semantic Differential, which utilizes nine word-pairs on a six-point scale with 6 indicating a strongly positive attitude, are given below.

Fathers' Childhood Companion Animal Semantic Differential
Attitudes about Their Childhood Most Important Pet

Word-Pair	Mean	SD
Bad / Good *	5.62	0.60
Not loving / Loving *	5.32	1.02
Friendly / Not friendly	5.46	0.58
Cuddly / Not cuddly	4.69	1.46
Cold / Warm *	5.06	1.34
Pleasant / Unpleasant	5.45	0.85
Kind / Cruel	5.40	0.91
Bitter / Sweet *	4.78	1.08
Distant / Close *	5.08	1.03

* = reversed item

The summary scores for the fathers' childhood Companion Animal Semantic Differential are given below. These summarize the fathers' attitudes toward their most important childhood pet.

Fathers' Attitudes about his Most Important Childhood Pet
Companion Animal Semantic Differential

Summary Scores

Score	Mean	Standard Deviation
Total Score	46.22	6.65
Evaluative Factor	-1.22	4.95

Fathers and their Children's Home Environments

The fathers were asked to complete the adapted Environmental Assessment Index (EAI) (Poresky, 1987) as a self-report evaluation of the quality of their homes. Each item on the 23-item instrument was rated on a five-point scale ranging from "No items, never present or happens" to "vast items, always present or happens." An average rating was calculated for each respondent. The paternal EAI scores ranged from 3.39 to 4.65 (M = 4.10, SD = 0.28).

Fathers' Family Relations

The 15-item relationship inventory (Schumm, et al.; 1980) was completed by the fathers. Each of the items is rated on a five-point scale ranging from "Strongly Disagree" to "Strongly Agree." This scale yields scores on three factors: congruence, empathy and regard.

Fathers' Relationship Inventory Results

Scale	Mean	SD
Congruence	20.63	2.99
Empathy	18.95	2.68
Regard	22.53	2.46

The fathers were also asked in they survey how well they got along with their wife and their 3 to 6 year old child who they identified and focused on for this survey. The results of their ratings on the nine-point scale ranging from "Very Well" (9) to "Very poorly" (1) are given on the next table.

Fathers' Family Relationships

With their...	Mean	Standard Deviation
Wife	8.26	1.15
Child	8.35	.99

Fathers' Marital Satisfaction

The three items on the Kansas Marital Satisfaction scale were rated by the fathers on the 7-point scale ranging from "Extremely Dissatisfied" (1) to "Extremely Satisfied" (7). The fathers' responses to these three items is given below.

Fathers' Marital Satisfaction

Items	Mean	Standard Deviation
How satisfied are your with...		
1. ... your marriage?	6.14	0.85
2. ... your relationship with your wife?	6.21	0.83
3. ... your wife as a spouse?	6.30	0.68
Total Score	18.58	2.16

Child's Pets - Paternal Report

The children's fathers noted an average of 1.55 pets (SD = 1.58) for their contemporary households. These included an average of 0.79 dogs and 0.68 cats. Thirty-seven fathers listed a most important pet for their child including 20 dogs and 13 cats. The fathers' reports of their 2 - 6 year old children's interactions with their pets on the Companion Animal Bonding Scale is shown in the next table. The CABS has eight items which were rated by the fathers as occurring either Always, Generally, Often, Rarely or Never.

Children's Companion Animal Bonding Scale
Fathers' Report
Percent
n = 53

Item	Always	Generally	Often	Rarely	Never
1. Child responsible..	0	5	13	56	26
2. Clean up..	0	5	0	46	49
3. Hold, stroke, or pet	5	23	56	15	0
4. Pet sleep in child's room	8	3	15	21	54
5. Feel pet is responsive	11	16	40	32	3
6. Feel close relationship	14	16	46	22	3
7. Travel with pet	3	10	8	33	46
8. Sleep near	3	0	14	16	68

The fathers' report of their children's bond is summarized by the following scale scores:

Children's Companion Animal Bonding Scale
Fathers' Report
Summary Scales

Summary	Mean	SD	Minimum	Maximum
Full Scale Score	18.42	5.04	11	33
Involvement Factor	-4.48	2.67	-8.33	3.65

The fathers' attitudes toward their child's most important pet is reflected in the Companion Animal Semantic Differential. This use of the scale reflects how the children's fathers feel about the pet they judge to be most important to the child they focused on for this survey. This semantic differential has nine word-pairs with a six-point scale between the words. The father was asked to place a mark between the words which describes his feeling about the animal. Three of the items were reversed to control for a response bias and all were converted to a code with 6 indicating a positive attitude. The attitudes are summarized in

the next table.

Fathers' Attitudes toward the Child's Most Important Pet
Companion Animal Semantic Differential

Word-Pair	Mean	SD
Bad / Good *	5.31	0.86
Not loving / Loving *	4.82	1.12
Friendly / Not friendly	5.00	1.11
Cuddly / Not cuddly	4.28	1.13
Cold / Warm *	5.05	0.97
Pleasant / Unpleasant	5.36	0.78
Kind / Cruel	5.31	1.00
Bitter / Sweet *	4.89	0.96
Distant / Close *	4.69	1.13

* = reversed item.

This scale yields a total score and an evaluative factor score. The fathers' attitudes toward their children's most important pets is summarized by these summary scores shown in the table below.

Fathers' Attitudes toward the Child's Most Important Pet
Companion Animal Semantic Differential

Summary Scores

Score	Mean	Standard Deviation
Total Score	44.65	7.38
Evaluative Factor	-2.46	5.64

Child Data

The data in this section was provided by the parent(s) of the young children based on their knowledge and observations as well as their questioning of their child. Further child information derived from the home visits is also included in this section. This section includes both child development and child pet attitude results.

Mothers' Ratings of their Children's Social Development

The Iowa Social Competency Scales (ISCS) (34-item Mother Form) was completed by the children's mothers as a description of the children's social functioning. The mother ISCS instrument yielded scores on the scales shown in the table below.

Iowa Social Competency Scales (Mother Form)
Factor Scores

Scale	Sample Mean	Standard Deviation
Social activator	-.42	3.32
Hypersensitive	-.02	1.03
Reassurance	-.27	2.56
Uncooperative	.18	1.36
Cooperative	-.49	2.37

Fathers' Ratings of their Children's Social Development

The Iowa Social Competency Scales (ISCS) (29-item Father Form) was completed by the children's fathers as a description of the children's social functioning. The father ISCS instrument yielded scores on the scales in the next table:

Iowa Social Competency Scales: Father Form
Means and Standard Deviations

Scale	Sample Mean	Standard Deviation
Social activator	-.31	3.59
Hypersensitive	.06	1.81
Reassurance	.03	1.86
Socially Inapt	.01	0.99
Attentive	-.11	1.12

Child Development

This section summarizes the results of the child development questionnaire derived from the Denver Prescreening Developmental Questionnaire (Frankenburg, 1975) plus additional items included to raise the instrument's ceiling. The children's performance on each item as reported by the children's parents is summarized below. The parental responses were:

"YES" - Child can do now or has done in the past
"NO" - Child cannot do now, has not done in the past or you are not sure that your child can do it now.
"R" - Child refuse to try.
"NO-OPP" - Child has not had the change to try.

Child Development Items

No.	Item	Percent of Responses			
		Yes	No	Refuses	N-O
1.	Scribbles on paper	99	1	0	0
2.	Stacks four 1" blocks	99	0	0	1
3.	Puts two words together	100	0	0	0
4.	Names two pictures	100	0	0	0
5.	Throws ball overhand 5 feet	93	6	1	0
6.	Follows all three directions	100	0	0	0
7.	Draws 1" straight line	95	4	1	0
8.	Jumps up with both feet	99	1	0	0
9.	Puts on own shoes	97	3	0	0
10.	Pedals tricycle ten feet	93	3	0	4
12.	Washes and dries hands well	100	0	0	0
13.	Uses an "s" for plurals	100	0	0	0
14.	Balances on one foot 2 sec.	93	6	1	0
15.	Broad jump 11"	96	4	0	0
16.	Draws acceptable circle	95	5	0	0
17.	Stacks eight 1" blocks	94	6	0	0
18.	Plays games with rules	94	3	0	3
19.	Puts on clothes	95	4	1	0
20.	Says first and last name	92	8	0	0
21.	Knows "cold, hungry and tired"	93	7	0	0
22.	Buttons clothing	80	15	1	4
23.	Balances on one foot 6 seconds	76	23	1	0
24.	Points to "longer" line	92	8	0	0
25.	Draws cross	90	10	0	0
26.	Follows three directions	99	1	0	0
27.	Separates calmly and easily	83	13	0	4
28.	Identifies four colors	97	3	0	0
29.	Hops two or more times	79	20	1	0
30.	Dresses self completely	71	28	1	0

Child Development Items
(continued)

No.	Item	Percent of Responses Yes	No	Refuses	N-O
31.	Draws man - 3 parts	72	26	1	1
32.	Draws man - 6 parts	45	54	0	1
33.	Opposite analogies	93	6	0	1
34.	Catches small ball in hands	59	41	0	0
35.	Balanced on one foot - 11 seconds	54	44	1	1
36.	Draws acceptable square	68	32	0	0
37.	Knows composition of three things	50	49	0	1
38.	Know people have two ears	99	1	0	0
39.	Counts accurately to 10	96	4	0	0
40.	Answers 3 of 5 action questions	91	9	0	0
41.	Subtracts 3 from 8 = 5	41	56	0	3
42.	Dozen equals twelve	12	84	0	4
43.	Imitates taps on table	77	23	0	0
44.	Identifies penny, nickel, dime	29	70	0	1
45.	Counts to 20	58	41	1	0
46.	Balances on one foot, eyes closed	25	74	0	1
47.	Names ten animals	70	27	3	0
48.	Raises left hand, right foot	54	46	0	0
49.	Penny + nickel + dime = 16 cents	3	92	0	5
50.	Copies house figure	63	33	3	1

A total score for each child was calculated as the number of items the parent(s) said the child accomplished successfully. These child development scores ranged from 14 to 48 with a mean of 37.53 (SD = 7.96).

These scores were converted to an age-adjusted score by dividing the number of accomplishments by the child's age and multiplying by a constant to achieve a mean of about 100. This yielded a Denver Quotient which ranged from 44.8 to 136.08 with a mean of 101.63 (SD = 15.33).

Home Visitor Child Development Measures

Four additional child development measures were obtained during the home visits. These included intellectual development, empathy, sharing and cooperation. The descriptive results for these measures are given below.

The Peabody Picture Vocabulary Test was administered during the home interviews to the child by the home visitors. The standardized scores are age-adjusted and higher scores indicate relatively greater performance on the test. The mean for the home visit group is significantly higher than the national norm (112.15 vs. 100.00, df = 40, $t > 6$, $p < 0.001$).

Perceptive-taking accuracy, the ability to properly identify the emotion of a child or dog in the vignette and having similar feelings, defined empathy in this study. The Empathy measure had a cognitive and affective subscales. Higher scores represent greater accuracy and similarity of emotional feelings (empathy).

The sharing ratio was the ratio of the number of raisins the child would allocate to his or her mother and a pet. A higher ratio indicates a higher allocation to the mother than the pet.

Cooperation was the number of pencils a child picked up when the home visitor "accidentally" dropped them on the floor. A higher score indicates more spontaneous sharing.

Home Visitor Child Development Measures

Measure	Mean	n	Standard Deviation
Peabody Picture Vocabulary Test	112.15	41	12.95
Empathy	1.98	38	0.26
Cognitive - dog	10.34	38	1.20
Affective - dog	10.05	38	1.40
Cognitive - child	10.20	38	1.41
Affective - child	9.74	38	1.62
Sharing ratio (mother / pet)	1.07	39	0.29
Cooperation	1.98	40	2.42

Children's Pet Attitudes

To learn about the children's attitudes toward pets, their parents were asked to administer the Companion Animal Semantic Differential to their children in a concrete manner. The parents were to ask their children to place the "pet button" in one of the boxes between each of the word pairs. This resulted in a score from 1 to 6 for each word pair. The scores on the five reversed items were recoded so that a score of 6 is a positive attitude for each of the nine items. The results for each item are given in the next table.

Children's Pet Attitudes
Companion Animal Semantic Differential
Parental Assessment
Percent Distribution
Word-Pair Results
(n = 66)

	Positive				Negative		Mean	Standard
Word-pair	6	5	4	3	2	1		Deviation
Bad/Good *	91	5	0	5	0	0	5.82	0.65
Not loving / Loving *	88	3	1	7	0	0	5.72	0.83
Friendly / Not friendly	93	1	3	3	0	0	5.84	0.61
Cuddly / Not cuddly	87	4	4	4	0	0	5.74	0.75
Cold / Warm *	79	6	4	10	0	0	5.54	0.98
Pleasant / Unpleasant	88	5	2	6	0	0	5.74	0.77
Kind / Cruel	94	1	0	1	0	0	5.85	0.63
Bitter / Sweet *	89	5	2	5	0	0	5.79	0.69
Distant / Close *	91	2	3	5	0	0	5.79	0.71

* = reversed item.

Children's Attitudes toward their Most Important Pet
Companion Animal Semantic Differential
Parental Assessment

Summary Scores

Score	Mean	Standard Deviation
Total Score	45.61	8.51
Evaluative Factor	1.99	6.54

The children's pet attitudes were also assessed during the home visits by the home visitor. The children's pet attitudes on the Companion Animal Semantic Differential are shown on the next tables.

Children's Pet Attitudes
Companion Animal Semantic Differential
Home Visitor Assessment
Percent Distribution
Word-Pair Results
(n =41)

	Positive				Negative		Mean	Standard
Word-pair	6	5	4	3	2	1		Deviation
Bad/Good *	71	0	0	0	0	29	4.54	2.30
Not loving / Loving *	80	2	0	0	2	15	5.15	1.85
Friendly / Not friendly	83	5	0	0	0	12	5.34	1.65
Cuddly / Not cuddly	78	2	5	0	0	15	5.15	1.80
Cold / Warm *	66	7	2	0	0	24	4.63	2.15
Pleasant / Unpleasant	78	2	0	0	0	20	5.00	2.00
Kind / Cruel	68	10	0	0	0	22	4.81	2.06
Bitter / Sweet *	78	2	0	0	0	20	5.00	2.00
Distant / Close *	63	2	2	0	2	29	4.64	2.31

* = reversed item.

Children's Attitudes toward their Most Important Pet
Companion Animal Semantic Differential
Home Visitor Assessment

Summary Scores

Score	Mean	Standard Deviation
Total Score	43.95	11.26
Evaluative Factor	-3.45	8.82

Analytic Results

The results are presented in two major sections. The first section presents information on the reliability and validity of the key research instruments. The second section presents the tests of the hypotheses and is arranged by the hypotheses.

Instrument Data

Companion Animal Bonding Scales

The crucial instrument in this study is the Companion Animal Bonding Scale used by the children's parents to estimate the behavioral bonding behavior of their child. This instrument's reliability and validity is reported in Poresky, Hendrix, Mosier and Samuelson (1987). The instrument yields a full scale score and an evaluative factor score. The interrater reliability correlation coefficients for the mothers and fathers who described their children's care of their pets were 0.80 and 0.77 for the full scale score and the factor score (both significant, (p < 0.01). During the home visits further data was collected and the father-home visitor interrater correlations were 0.41 and 0.44 for the full scale and factor score (not significant). The mother-home visitor interrater correlations were 0.58 and 0.56 respectively. The mother-home visitor correlations were statistically significant.

Companion Animal Semantic Differential

Two estimates of the children's attitudes toward pets were obtained. These were the parental assessment of the children's attitudes and the home visitor's assessment of their attitudes on the Companion Animal Semantic Differential. The intercorrelation between these assessment was 0.45. which is almost statistically significant (df = 15, p < 0.07).

Developmental Measures

Iowa Social Competency Scales

The Iowa Social Competency Scales were completed by both the children's mothers and fathers. There are three parallel, but not identical, mother and father scales. The interrater correlations for "social activator", "hypersensitive", and "reassurance" were 0.25, 0.38 and -.29 respectively.

Denver Prescreening Developmental Questionnaire

The developmental measures also included an adaptation of the Denver Prescreening Developmental Questionnaire (Frankenburg, 1975). The fathers' estimates of their children's development were based on the number of items which the fathers said the children passed. This measure showed the expected strong correlation with the children's age ($r = 0.82$, $p < 0.001$). An age-adjusted estimate, based on the number of items passed divided by the child's age and multiplied by a constant, was inversely correlated with the children's age ($r = -.28$, $p < 0.05$).

Environmental Assessment Index (survey form)

The quality of the children's homes was assessed through the administration of the survey form of the Environmental Assessment Index (Poresky, 1987). The mothers' and fathers' ratings of their homes were significantly correlated ($r = 0.41$, $p = 0.002$). The home visitors' ratings were not significantly correlated with either the mothers' or the fathers' ratings (r's = 0.30 and 0.24, respectively). The reported family income was correlated with the fathers' Environmental Assessment Index ($r = 0.39$, $p = 0.006$) as expected.

Hypothesis Tests

Hypothesis One: Pet Ownership Effects on the Children.

> Children who have a bond with a dog or cat show more maturity in their cognitive, moral and emotional development (e.g., decentration, responsibility, self-concept, empathy, attachment) than children who do not have such pets.

The indices of child development were compared for children who had and did not have a pet. T-test comparisions were computed for the child development measures. These included the mother and father Iowa Social Competency Scales, the Denver Prescreening Questionnaire scales, the Companion Animal Semantic Differential, the empathy scales, helping,, sharing, the Peabody Picture Vocabulary Test and cooperation. Of the twenty pet - no pet comparisons shown on Table 1, only one t-test was significant at the 0.05 significance level. Children with pets had higher Empathy scores (2.03 vs. 1.88, $p < 0.05$).

Three other child measures showed the expected trends at the $p < 0.10$ level of statistical significance. Children with a pet had more positive pet attitude scores on the Companion Animal Semantic Differential (47.84 vs. 41.38, $p < 0.10$). They also had a higher cognitive empathy score (10.47 vs. 9.63, $p < 0.10$). Young children with pets appeared to have higher Peabody Picture Vocabulary Test scores (114.96 vs. 107.27, $p < 0.10$). Please see Table 1 for more information on the pet - no pet t-test results.

One-way analyses of variance including the children with no pets and the children with pets divided into three bonding groups, based on their mothers' and fathers' reports of their companion animal bond, were used to analyze the effect of pet ownership and relationship in more detail. No significant differences emerged when the fathers' ratings of their child's pet relationship was used to divide the sample. The analyses based on the mothers' reports of their children's pet bonds did shows significant effects associated with pet ownership and bonding. Children with a strong pet bond were rated as providing more "reassurance" ($p < 0.001$) on the mothers' Iowa Social Competency Scales. Children with pets showed more empathy than those without ($p < 0.05$) and the empathy score appears to increase with increasing bond strength. The two "child" empathy subscales showed a similar pattern with children with stronger bonds apparently showing greater empathy of children than those with no pet (both $p < 0.05$). There was also a trend for children with pets to be less "hypersensitive" on the mothers' ISCS ($p < 0.10$).

These results provide limited support for the first

hypothesis one statistically significant "pet ownership" difference favoring the children with pets and five differences also showing a developmental benefit associated with pet ownership when the strength of the pet bond was also considered. The second hypothesis examines the importance of the strength of the pet bond more closely.

Hypothesis Two: Pet Bonding Effects on the Children.

> Children who have a more interactive relationship with their pet are more affected by that relationship than those with a more distant relationship.

Two general techniques were used to analyze the relationship between the strength of the young children's companion animal bond (human-animal bond) and aspects of the children's development for the children who had pets. Linear correlations between the bonding scores and the developmental measures were used for the initial analysis and are shown on Table 3. One-way analyses of variance based on grouping the children into three bonding groups were used for further analysis. The children with pets were assigned to one of the three groups based on the mothers' reports of the children's bond, the fathers' report of the children's bond, and the bonding data gathered during the home visits. The one-way analysis of variance results are summarized in Tables 4a, 4b, and 4c, respectively.

Correlational Results

The mothers' descriptions of their children's relationship with their most important pet on the Companion Animal Bonding Scale (Poresky, et al 1987) were compared with the child development measures. Significant correlations were obtained for the full scale CABS scores and two of the five mother ISCS social competency measures and a trend was found for a third scale. The child's bond with their most important pet was positively correlated with their "reassurance" score ($r = 0.46$, $p < 0.01$) and inversely correlated with their "uncooperative" score ($r = -0.35$, $p < 0.05$). The trend was between the bond and "social activator" ($r = 0.28$, $p < 0.10$). These results show a beneficial relationship between the child's companion animal bond and the child's social development. Please see Table 3 for the correlational results.

The involvement factor of the mothers' ratings of their children's companion animal bond showed even stronger relationships with the Iowa Social Competency Scale scores. The children's pet involvement was significantly correlated with three

social competency measures. Pet involvement was positively correlated with the child's "social activator" ($r = 0.32$, $p < 0.05$) and with the child's "reassurance" ($r = .45$, $p < 0.01$). Pet involvement was inversely correlated with the child's "uncooperativeness" ($r = -0.42$, $p < 0.01$).

Fathers' ratings of their children's companion animal bonds also produced significant results. The fathers' survey child Companion Animal Bonding Scale (full scale) scores were compared with their ratings of the children's social competency on the five father Iowa Social Competency Scales. No statistically significant correlations were obtained. The third CABS factor, "responsiveness," was significantly correlated with two of the Iowa Social Competency Scales. The significant correlations were an inverse correlation with ISCS "hypersensitivity" ($r = -0.35$, $p < 0.05$) and an inverse correlation with ISCS "socially inapt" ($r = -0.37$, $p < 0.05$).

Due, in part to the smaller number of children in the home visitor study, no home visit measures' correlations were significant.

These correlational results support the "pet bonding" hypothesis by showing beneficial effects associated with young children's companion animal bonds and five aspects of their social development.

One-way Analysis of Variance Results

Social Development

The effects associated with the strength of the child's pet bond were also assessed by one-way analyses of variance where the children with pets were divided into three groups who were rated by their mothers as having a weak, moderate or strong bond. The number of young children in these groups was 15, 15, and 11, respectively, for most analyses based on the survey data. The children in the strong bond group had a significantly lower score on the mothers' ratings of their children on the ISCS "hypersensitive" scale than the children in the moderate bond group ($F = 3.60$, $df = 2/37$, $p < 0.05$). Similarly, the children in the strong pet bond group had a higher mother ISCS "reassurance" score than the children in the weak and moderate groups ($F = 7.74$, $df = 2/38$, $p < 0.01$). See Table 4a.

The fathers' social development ratings of their children were also compared with the mothers' ratings of the children's bonds with their pets (Table 4b). While the fathers' ISCS "reassurance" score was not quite significant ($F = 2.83$, $df =$

2/31, $p > 0.08$), a $p. = 0.05$ difference was found with the weak bond group having a higher score than the strong bond group.

Empathy

Young children rated by their fathers as having a strong pet bond were higher on Empathy than children with a weak pet bond ($p < 0.05$) although the overall F-test for the sample was only marginal ($F = 3.30$, $df = 2/16$, $p = 0.06$). A similar result was found on the Empathy subscale pertaining to the children's affective response to another child ($F = 2.72$, $df = 2/16$, $p < 0.10$) where the significant paired comparison was between the strong bond group ($M = 11.40$) and the weak bond group ($M = 9.53$).

Peabody Picture Vocabulary Test Results

While the one-way ANOVA for the standard scores on the Peabody Picture Vocabulary Test, administered during the home visits, only approached significance ($F = 2.67$, $p = 0.10$), the LSD paired comparisons showed a significant ($p < 0.05$) difference between those with a moderate bond and those with a strong bond. The means for the weak, moderate and strong pet bond groups were 111.00, 124.20 and 108.83 respectively.

Sharing

Based on the home interview child-pet bonding score group analyses, children with a weak pet bond shared more raisins with their mothers than children with a moderate pet bond or a strong companion animal bond ($F = 3.54$, $df = 2/22$, $p < 0.05$). The ratio of raisins allocated to the mother vs. the pet by the children's pet bond strength were 1.17, 1.01 and 0.98 for the weak, moderate and strong bond groups respectively. These sharing results may be more a demonstration of the validity of the bonding measure than a consequence of the bond. While the variation in the ratio is moderate, it is consistent with the "bond" concept in that those children with a weak pet bond gave more raisins to their mothers and those with a strong pet bond gave more raisins to the hypothetical pet.

This "pet bonding" hypothesis is strongly supported by the significant findings which show social development benefits associated with the strength of the bond or relationship between the children and their pets. Significant bonding strength effects were found for two of the social competency scales , the empathy measure, the intellectual development measure, and children's sharing.

Hypothesis Three: Pets and the Quality of Children's Homes

> Family environments which include dogs or cats facilitate children's development more than those without pets.

Children's home environments were analyzed to determine if the presence of a dog or cat was systematically associated with the developmentally supportive qualities of the home. The examined qualities included the parents' relationship inventory scores and their estimates of the developmental quality of their homes. The analyses included t-test comparision of homes with and without pets and more detailed one-way analyses of variance including homes without pets and homes with pets divided into three child pet bonding strength groups.

Home Environment and Pet Ownership / Bonding

Three measures of the developmental quality of the children's home environment were obtained on the Environmental Assessment Index. These included the ratings on the scale by the children's mothers and fathers and by the home visitor. T-test comparisons of the means for the homes with and without pets yielded no significant differences (Table 5). No significant differences found in the families' income. One significant analysis of variance result was obtained indicating a higher EAI score for homes where the mother reported her child had a moderate pet bond ($F = 3.00$, $df = 3/48$. $p < 05$) (Table 6). Strong correlations were also found between the home visitor bond estimate and the mothers and fathers EAI ratings ($r's = 0.57$ and 0.70, respectively, both $p < 0.05$). These influences may enhance the beneficial effects of pets for young children.

Family Relationships and Pet Ownership / Bonding

The Relationship Inventory data was analyzed to assess the differences in homes with a pet and those without a pet. Fathers without pet in their home had a higher empathy score than fathers with pets (19.95 vs. 18.53, $p < 0.05$) and a higher regard score (23.44 vs. 21.92, $p < 0.05$). These results may cloud the beneficial effects of pets for young children. No significant differences were found for the children's mothers on the family relations scales. No significant differences were obtained on the Kansas Marital Satisfaction Scale. See Table 5 for more information on these comparisons.

The one-way analysis of variance based on the mothers' ratings of their children's' bonds yielded a trend for the fathers' "regard" scale ($F = 2.57$, $df = 3/49$, $p < 0.10$). The fathers' "regard" score for the no pet group was significantly ($p < 0.05$) higher than for the moderate bond group. These analyses are summarized on Table 6.

The one-way analyses of variance based on the fathers' ratings of their children's pet bonding yielded a findings for the fathers' "congruence" scale associated with the pet ownership and bonding groups ($F = 2.59$, $df = 3/48$, $p < 0.10$). The fathers' "congruence" scores for the no pet and weak bond bond group was significantly ($p < 0.05$) higher than for the strong bond group. The fathers' empathy scores also showed a trend with the moderate bond group's fathers scoring lower than the other groups.

Further analyses were performed on the data for children with pets. The children with pets were divided into three pet-bonding groups based on the home interview answers to the Companion Animal Bonding Scale items. Those with a moderate bond had fathers who were higher on the "empathy" family relations scale than those with a weak bond ($F = 4.75$, $df = 2/16$, $p < 0.05$). The mean fathers' family relations "empathy" scores were 19.71 for the moderate bond group and 17.20 for the weak bond group. On fathers' "regard" similar results were found with the fathers of children with a moderate pet bond had a higher "regard" score than fathers of the other children ($F = 3.95$, $df = 2/16$, $p < 0.05$). The means for the fathers of children with strong, moderate and weak pet bonds were 21.71, 23.85 and 21.00, respectively.

These results provide evidence of family environment influences which are associated with pet ownership and bonding. These elements of the family environment may effect the children's development. The simple "pet ownership" comparisons of family environments with and without pets revealed two significant effects involving fathers' regard and empathy. The more complex "pet ownership / bonding" comparisons revealed more complicated results with significant associations between pet ownership and bonding and the fathers' congruence, empathy and regard scores as well as the quality of the children's home environment. For families with pets, the fathers' empathy and regard scores were higher in families where the child had a "moderate" pet bond.

Hypothesis Four: Family Effects on Bonding and the Children

Companion animal effects on a child are directly affected by family relationships.

The family environment elements which were associated with pet ownership / bonding were checked against the child development measures. The mother and father EAI scores were correlated with many of the child development measures.

Quality of the Home Environment and the Children's Development

The quality of the children's home environment was positively correlated with the raw score measure of the children's development and the age-adjusted measure of the children's development. The fathers' responses to the survey form of the Environmental Assessment Index was positively correlated with the fathers' report of the number of items which the children accomplished on the adaptation of the Denver Prescreening Questionnaire ($r = 0.29$, $p = 0.03$) for the 54 cases where the fathers of children with and without pets responded. The correlation was even stronger for the age-adjusted developmental measure ($r = 0.45$, $p < .01$). The mothers' survey results show a similar, but nonsignificant, linkage between their estimate of the quality of their home environment and their children's success on the Denver Prescreening Questionnaire ($r = 0.22$, $p < 0.10$).

The fathers' rating of the quality of their home environments was also correlated with their estimates of their children's social competency. The fathers' home environment rating was positively correlated with their children ISCS "social activator" rating ($r = 0.36$, $p < 0.01$), inversely with "hypersensitive" ($r = -.41$, $p < 0.01$), inversely with "reassurance" ($r = -.34$, $p < 0.05$) and positively correlated with the mothers' ratings of "social activator" ($r = 0.31$, $p < 0.05$). The mothers' home environment ratings were inversely correlated with fathers' ratings of the ISCS "hypersensitive" ($r = -.30$, $p < 0.05$) and their ratings of their children's ISCS "social activator" ($r = 0.29$, $p < 0.05$). These correlations are reported in Table 7.

Quality of the Home Environment and Pet Bonding

The fathers' and mothers' estimates of the quality of their home environments was strongly correlated with the home visitor's assessment of the child's pet bond (CABS) (r's = 0.70 and 0.57, respectively, both $p < 0.01$). The mothers' Environmental Assessment Index scores were also correlated with their husband's estimate of the children's pet bond ($r = 0.30$, $p < 0.10$) and

significantly correlated with their own estimate of the child-pet bond ($r = 0.32$, $p < 0.05$).

Bonding, Home Environment and Child Development

Bonding and the quality of the children's home environment, taken together, were found to account for the children's development. The children's successes on our adaptation of the Denver Prescreening Developmental Questionnaire were accounted for by the children's pet ownership / bonding group and home environment (fathers' EAI). This analysis of variance with the children's age as a covariate is summarized below:

Bonding and Home Environment vs. Child Development
Analysis of Variance with Covariate
Summary

Source	df	F	p
Covariate (age)	1	139.58	0.000
Main Effects			
Bonding	3	2.88	0.048
EAI	1	8.95	0.005
Interaction	3	2.83	0.051

The adjusted child development means were 33.47, 40.18, 38.50, and 39.09 for the no pet and three bonding groups, respectively. With a two level split on the Environmental Assessment Index ratings the child development means were 35.46 and 39.74, respectively for the low and high EAI homes. Children from homes without a pet and from homes with low EAI scores had lower child development scores.

Family Relationships and Pet Bonding

The four group one-way analysis of variance resulted in a marginal F ($p = 0.098$) difference between pet ownership and the fathers' perceptions of their family's "regard". The group average regard score was significantly higher for those with no pet than those families where the child had a moderate or strong pet bond ($p < 0.05$).

Further analyses of possible associations between pet bonding and family factors were conducted with one-way analyses of variance in which the children with pets were divided into three bonding groups. The family factors were then analyzed by bonding group. Based on the fathers' report of the child's companion animal bond, fathers' "congruence" was almost associated with pet

bonding ($p < 0.10$) with the moderate bond group families being higher than the strong bond group ($p < 0.05$) and the weak bond group falling in between.

Family Relationships and Children's Pet Attitudes

The fathers' survey data on their perceptions of their family relationships and their children's attitudes toward animals were significantly correlated. The fathers' "congruence" score was correlated with the children's Companion Animal Semantic Differential (Poresky, Hendrix, Mosier & Samuelson; 1988) score ($r = 0.38$, $p < 0.05$). Fathers' "empathy" was correlated with pet attitudes ($r = 0.44$, $p < 0.01$) as was father's "regard" score ($r = 0.48$, $p < 0.01$). The family life satisfaction score was not correlated with the child's pet attitudes.

These analyses show linkages between many family environment elements and the developmental measures as well as with pet bonding. These linkages with the quality of the children's home environments, due to their directionality, will enhance the bonding effects. Conversely, the family relationship effects appear to have an inverse effect which pet bonding may counter.

Discussion

This report presents evidence which supports the premise that pets have developmental value for young children. Both "pet ownership" and "pet bonding" benefits were found. These findings are based on the analysis of twenty interrelated measures of the young children's development. The large number of dependent measures and large number of analyses suggest caution in interpreting these exploratory results because some statistically significant results may be attributable to chance.

These results support Levinson's (1987) assertion that children's empathy can be promoted by raising a pet. The social development benefits associated with pet ownership strengthen Frith's (1952) description of the benefits a child could receive from association with companion animals. These results were strongest for the Iowa Social Competency Scales measures of young children's social development.

Robin and ten Bensel (1985) did not find a significant pet ownership effect in their study of teen-agers. Poresky, Hendrix, Mosier & Samuelson (1987; 1988) emphasized the importance of reaching beyond "pet ownership" to "pet bonding" when assessing the importance of pets for human development. The results of this study show stronger effects when the strength of the bond between the child and the dog or cat is considered.

Horn and Meer (1984) reported public support for the proposition that pets are important for children and these results provide support for the public view. As Hyde, Kurdek and Larson (1983) noted, the beneficial effects seem to be strongest in the social domain with stronger effects being found on the social development measures than the cognitive measures. While these results do not directly speak to the value of animals in psychotherapy, the linkages with the empathy and social development measures are consistent with the recommendations supporting the use of animals in psychotherapy by Camppo and Vilar (1977), MacDonald (1979), Salomon (1982), and Sherick (1981).

People's attitudes toward pets are influenced by their experience with animals (Serpell, 1981). Poresky, Hendrix, Mosier, & Samuelson; 1988) found adults' attitudes were influenced more by their childhood experiences than their adult experiences. These results extend the adult findings to young children by showing that young children with pets had more positive attitudes toward pets than children who did not have a pet dog or cat.

The determinants of children's development are manifold. As these results show, the effects of pets on young children are associated with other aspects of children's near environments.

The Environmental Assessment Index (Poresky, 1987) measures of the quality of the children's homes were associated with both developmental outcomes and pet bonding. Children from homes without a pet and from homes with low EAI scores had lower child development scores than the other children. The Relationship Inventory scales were also associated with some of the developmental outcomes and the Companion Animal Bonding Scale estimate of the children's bond with their pets.

These exploratory results support the study's hypotheses:

1. Children who have a bond with a dog or cat show more maturity in their cognitive, moral and emotional development (e.g., decentration, responsibility, self-concept, empathy, attachment) than children who do not have such pets.

2. Children who have a more interactive relationship with their pet are more affected by that relationship than those with a more distant relationship.

3. Family environments which include dogs or cats facilitate children's development more than those without pets.

4. Companion animal effects on a child are directly affected by family relationships.

The complexity of the potential interactions between the pet bonding effects and the other home environment elements which affect children's development clouds unifactorial explanations of the role of pet bonding within the family environment. Further research to clarify the developmental benefits of pets on young children is needed to both replicate these results with a narrower child development focus and more precisely identify the multifactorial processes involved. Such research should limit the number of developmental measures in each study and increase the diversity and representativeness of the children and their families.

These results provide a starting point and also demonstrate the feasibility of research on the developmental benefits of pets for young children. The strength of these exploratory results demonstrate the strength of the research instruments for assessing the child - pet bond and pet attitudes. Further refinement is possible and replication of the results is essential for the assertion of the developmental benefits of companion animals. Another challenge is to identify the characteristics of those children and families who would derive the greatest benefit from their association with companion animals.

Summary

This exploratory study examined the validity of the following hypotheses which were derived from prior research by the authors and other scientists and therapists:

1. Children who have a bond with a dog or cat show more maturity in their cognitive, moral and emotional development (e.g., decentration, responsibility, self-concept, empathy, attachment) than children who do not have such pets.

2. Children who have a more interactive relationship with their pet are more affected by that relationship than those with a more distant relationship.

3. Family environments which include dogs or cats facilitate children's development more than those without pets.

4. Companion animal effects on a child are directly affected by family relationships.

Survey data from 88 parents about themselves, their homes, and their preschool age children provided empirical support for the hypotheses. Additional data from home interviews with some of the families provided further support to the general premise that there are developmental benefits of pets for young children. The benefits were primarily, but not exclusively, in the children's social domain. "Pet bonding" appeared to be a stronger determinant of the pet associated benefits than "pet ownership."

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TABLE 1

Pet Ownership Comparisons
Means and T-Test Results

Child Variables	No Pets	Pets	df	t	p
Parent Survey -					
Developmental Quot.	98.56	102.39	21.33*	-.70	.49
Father ISCS					
Social Activator	-.41	-.26	55	-.15	.88
Hypersensitive	-.22	.20	55	-.82	.41
Reassurance	.34	-.12	56	.90	.37
Socially Inapt	.03	-.01	56	.14	.89
Attentive	-.07	-.12	56	.15	.88
Mother ISCS					
Social Activator	-1.10	-.29	69	-.95	.35
Hypersensitive	-.28	-.04	71	-.97	.34
Reassurance	-.49	-.06	73	-.65	.52
Uncooperative	.12	.08	73	.11	.92
Cooperative	-.34	-.62	73	.47	.64
Pet Attitudes (CASD) (Parental Assessment)	41.38	47.84	17.77*	-2.02	.06
Home Visit					
Pet Attitudes (CASD)	44.20	43.81	39	.11	.92
Empathy	1.88	2.03	35.09*	-2.16	.04
Cognitive Persp.(ch)	9.63	10.47	36	-1.77	.09
Affective Persp.(ch)	9.42	9.89	35.97*	-1.08	.29
Helping	2.00	1.96	38	.05	.96
PPVT Standard Score	107.27	114.96	39	-1.89	.07
Sharing (mother/pet)	1.13	1.04	15.07*	.69	.50
Cooperation rating	6.80	6.80	37.84*	.00	1.00

* df for separate variance estimate

Table 2a.

Pet Ownership and Child Development
One-way Analyses of Variance Results

Mother's Report of Child's Pet Bond

Child Measures	No Pet	Weak	Moderate	Strong	n	F	p
Developmental Quot.	99.48	107.22	104.57	99.30	65	1.07	.3682
ISCS - father							
Social Activator	-.41	.22	.38	-1.74	52	.65	.5881
Hypersensitive	-.22	.09	.24	-.05	52	.18	.9084
Reassurance	.35	-.49	.21	-.05	53	.53	.6671
Socially Inapt	.03	-.03	-.02	-.12	53	.04	.9906
Attentive	-.75	-.07	.03	-.19	53	.06	.9783
ISCS - mother							
Social Activator	-.64	-1.22	.18	1.27	70	1.31	.2789
Hypersensitive	.07	-.12	.35	-.68	73	2.31	.0843
Uncooperative	.42	.34	-.04	-.57	74	1.73	.1684
Cooperative	-.59	-.30	-.49	.77	74	.98	.4086
Reassurance	-.64	-.12	-1.20	2.54	74	6.37	.0007
Empathy	1.88	1.94	2.05	2.28	29	4.46	.0121
Cog. Persp. Dog	10.15	10.44	10.20	10.95	29	.53	.6659
Aff. Persp. Dog	10.02	10.50	9.80	10.55	29	.43	.7354
Cog. Persp. Chi.	9.35	10.33	10.55	11.80	29	4.21	.0153
Aff. Persp. Chi.	9.13	9.53	10.60	11.40	29	4.48	.0120
Helping	1.54	2.50	1.25	4.00	30	1.44	.2550
PPVT Std. Score	109.85	121.44	109.60	116.00	32	2.00	.1374
Raisin Ratio	1.10	1.04	1.07	1.07	29	.06	.9825
Cooperation rating	7.08	7.25	6.50	7.20	30	.88	.4650

Table 2b.

Pet Bonding and Child Development
One-way Analysis of Variance Results

	Father's Report of Child's Pet Bond						
Child Measures	No Pet	Weak	Moderate	Strong	n	F	p
Developmental Quot.	95.88	106.46	100.43	99.14	49	1.05	.3789
ISCS - Father							
Social Activator	-.41	-.03	.67	-1.79	55	1.05	.3753
Hypersensitive	-.22	.34	.66	-.18	55	.72	.5463
Reassurance	.35	-.76	.35	.08	55	.93	.4321
Socially Inapt	.03	.17	.07	-.22	55	.33	.8051
Attentiveness	-.07	-.14	.15	-.56	55	.91	.4433
ISCS - Mother							
Social Activator	-1.19	-.78	.46	-.34	54	.56	.6496
Hypersensitive	-.24	-.10	.28	-.11	53	.67	.5767
Reassurance	-.40	-.19	-.91	-.50	54	.15	.9290
Uncooperative	.06	-.02	.39	-.23	53	.43	.7304
Cooperative	-.08	-.47	-.35	-.34	54	.09	.9639
Home visit Measures							
Empathy	1.89	2.03	2.01	2.15	24	1.08	.3817
Cog. Persp. Dog	10.36	10.67	10.40	11.33	24	1.16	.3483
Aff. Persp. Dog	10.21	10.67	11.00	10.38	24	.43	.7332
Cog. Persp. Child	9.21	11.00	10.60	10.46	24	1.62	.2158
Aff. Persp. Child	9.21	10.58	10.15	9.54	24	.61	.6187
Helping	1.25	1.67	3.33	2.50	23	.61	.6190
PPVT Standard Score	111.25	111.00	124.20	108.83	25	2.02	.1415
Raisin Ratio	.93	1.09	1.08	1.01	24	2.01	.1456
Cooperation rating	6.88	7.33	6.67	6.33	23	.75	.5370

TABLE 3.

Child Bonding (CABS) and Development
Pearson Correlations

	Source of Children's Companion Animal Bond Ratings		
	Mother	Father	Interviewer
Child Factors			
Parent Survey			
Developmental Quot.	-.11	-.34	-.25
ISCS - father			
Social Activator	-.24	-.32	.02
Hypersensitive	-.12	-.14	-.24
Reassurance	.18	.25	.26
Socially Inapt	.00	-.05	-.07
Attentive	-.13	-.32	-.11
ISCS - mother			
Social Activator	.28~	.06	.25
Hypersensitive	-.23	-.07	-.03
Reassurance	.46**	.01	.26
Uncooperative	-.35*	-.10	-.02
Cooperative	.21	-.01	.05
Home Visit Variables			
Empathy	.30	.11	.05
Cog. Persp. Dog	-.05	.31	-.07
Aff. Persp. Dog	-.08	-.08	-.15
Cog. Persp. Child	.26	-.19	.07
Aff. Persp. Child	.36	-.28	.00
Raisin Ratio (mo/pet)	-.12	-.26	-.28
PPVT Std. Scores	-.13	-.39	.08
Helping (30 seconds)	.35	.20	.01
Pet Attitude (CASD)	.12	.18	.45
Cooperation rating	.11	-.26	.03

Note: ~ = $p < 0.10$; * = $p < 0.05$; ** $p < 0.01$

Table 4a.

Pet Bonding and Child Development
One-way Analyses of Variance Results
Children With Pets

Mother's Report of Child's Pet Bond

	Weak	Moderate	Strong	N	F	p
Child Measures						
Developmental Quot.	107.22	104.57	99.30	40	1.19	.3154
ISCS - Father						
Social Activator	.22	.38	-1.74	33	.92	.4095
Hypersensitive	.09	.24	-.05	33	.06	.9392
Reassurance	-.49	.21	-.05	34	.51	.6056
Socially Inapt	-.03	-.02	-.12	34	.03	.9707
Attentive	-.07	.03	-.19	34	.09	.9098
ISCS - Mother						
Social Activator	-1.22	.18	1.27	38	1.42	.2560
Hypersensitive	-.12	.35	-.68	40	3.60	.0372
Uncooperative	.34	-.04	-.57	41	2.04	.1445
Cooperative	-.29	-.49	.77	41	1.38	.2627
Reassurance	-.12	-1.20	2.54	41	7.74	.0015
Home Visit Measures						
Empathy	1.94	2.05	2.28	19	3.30	.0630
Cog. Persp. Dog	10.44	10.20	10.95	19	.59	.5645
Aff. Persp. Dog	10.50	9.80	10.55	19	.46	.6368
Cog. Persp. Child	10.33	10.55	11.80	19	1.72	.2112
Aff. Persp. Child	9.53	10.60	11.40	19	2.72	.0965
Helping	2.50	1.60	4.00	18	1.22	.3240
PPVT Standard Score	121.44	109.60	116.00	19	1.60	.2328
Raisin Ratio	1.04	1.07	1.07	18	.04	.9610
Cooperation rating	7.11	6.50	7.20	18	.78	.4783

Table 4b.

Pet Bonding and Child Development
One-way Analysis of Variance Results
Children With Pets

Father's Report of Child's Pet Bond

Child Measures	Weak	Moderate	Strong	n	F	p
Developmental Quot.	106.46	100.43	99.14	34	1.22	.3089
ISCS - Father						
Social Activator	-.03	.67	-1.79	36	1.57	.2242
Hypersensitive	.34	.66	-.18	36	.70	.5044
Reassurance	-.76	.35	.08	36	1.17	.3243
Socially Inapt	.17	.07	-.22	36	.62	.5454
Attentive	-.14	.15	-.56	36	1.37	.2674
ISCS - Mother						
Social Activator	-.77	.46	-.34	35	.33	.7226
Hypersensitive	-.10	.28	-.10	35	.57	.5720
Reassurance	-.19	-.91	-.50	35	.20	.8164
Uncooperative	-.02	.39	-.23	35	.97	.3887
Cooperative	-.47	-.35	-.34	35	.01	.9860
Home Visit Measures						
Empathy	2.03	2.01	2.15	17	.39	.6837
Cog. Persp. Dog	10.67	10.40	11.33	17	1.15	.3452
Aff. Persp. Dog	10.67	11.00	10.38	17	.28	.7592
Cog. Persp. Child	11.00	10.60	10.46	17	.15	.8640
Aff. Persp. Child	10.58	10.15	9.54	17	.31	.7379
Helping	1.67	3.25	2.50	16	.46	.6430
PPVT Standard Score	111.00	124.20	108.83	17	2.67	.1045
Raisin Ratio	1.09	1.08	1.01	16	.52	.6070
Cooperation rating	7.33	6.50	6.33	16	.92	.4246

Table 4c

Pet Bonding and Child Development
Analysis of Variance Results
Children With Pets
Home Visitor's Ratings of Child's Pet Bond

Child Variables	Weak	Moderate	Strong	n	F	p
Developmental Quot.	111.38	102.33	105.08	18	.66	.5311
ISCS - Father						
Social Activator	-.05	-.51	-1.03	18	.11	.9001
Hypersensitive	1.78	-.62	-.37	18	2.16	.1497
Reassurance	-.79	-.28	.13	19	.39	.6819
Socially Inapt	.12	-.05	-.05	19	.08	.9256
Attentive	-.18	-.13	-.94	19	1.49	.2553
ISCS - Mother						
Social Activator	-1.57	-.35	1.71	25	1.74	.1991
Hypersensitive	-.14	-.18	.16	25	.33	.7228
Reassurance	-.94	-.77	.06	25	.27	.7639
Uncooperative	.09	.48	-.02	25	.54	.5920
Cooperative	-1.14	-1.78	-.40	25	.63	.5395
Pet Attitudes (CASD)						
Child's Pet by Father	42.25	46.80	47.71	16	1.23	.3229
Child by Fa - factor 1	-4.35	-1.09	.10	16	1.40	.2808
Child's Pet by Mother	42.25	44.00	47.29	16	.96	.4084
Child by Mo - factor 1	-4.23	-2.95	-.62	16	.92	.4241
Child's (home assm'nt)	44.60	49.00	50.43	17	2.24	.1434
Child's - factor 1	-2.47	.67	1.41	17	1.51	.2540
Child's- home visit	39.43	47.50	43.78	26	1.01	.3790
Child's - factor 1	-7.12	-.81	-3.75	26	1.00	.3838
Home Visit Measures						
Empathy	2.01	1.98	2.14	26	.83	.4492
Cognitive Persp. - Dog	10.79	10.30	10.08	26	.55	.5833
Affective Persp. - Dog	10.43	10.23	9.63	26	.56	.5810
Cognitive Persp.-Child	11.00	10.05	10.53	26	.83	.4499
Affective Persp.-Child	10.64	9.20	10.33	26	1.54	.2348
Helping	1.43	2.10	2.88	25	.64	.5370
PPVT Standard Score	114.86	113.20	112.67	26	.05	.9534
Raisin Ratio M/P	1.17	1.01	.98	25	3.54	.0466
Cooperation rating	6.57	6.60	7.13	25	.52	.5995

TABLE 5.

Family Relations and Pet Ownership
Means and T-Test Results

Family Variables	No Pets	Pets	df	t	p
Environmental Assessment Index					
Fathers' estimate	4.15	4.07	52	.98	.33
Mothers' estimate	4.00	4.02	62	-.28	.78
Home visitor	3.62	3.66	39	-.50	.62
Family Income (thousand $)					
Fathers' report	32.93	34.65	47	-.34	.74
Mothers' report	31.41	32.98	61	-.33	.75
Home Interview report	33.50	32.12	25	.27	.79
Relationship Inventory					
Congruence - Mothers	22.05	21.02	72	1.40	.17
Empathy - Mothers	18.41	19.23	72	-1.12	.27
Regard - Mothers	22.39	22.53	72	-.20	.84
Congruence - Fathers	20.95	20.13	56	.97	.34
Empathy - Fathers	19.95	18.53	52.88*	2.37	.02
Regard - Fathers	23.44	21.92	55	2.29	.03
Marital Satisfaction					
Fathers	18.78	18.54	55	.38	.70
Mothers	17.14	18.02	29.11*	-.77	.45

* df for separate variance estimate

TABLE 6.

Pet Ownership and Bonding and Family Relations
One-way Analyses of Variance Results
(Four Group)

Mother's Report of Child-Pet Bond

Family Factor	No Pet	Weak	Moderate	Strong	n	F	p
Relationship Inventory							
Mothers'							
Congruence	21.41	21.93	21.33	20.55	52	.58	.6277
Empathy	18.72	19.40	19.53	18.82	52	.40	.7559
Regard	22.03	22.87	22.80	22.90	53	.57	.6390
Fathers'							
Congruence	20.95	21.77	20.00	19.00	53	2.00	.1268
Empathy	19.95	18.54	18.13	18.57	55	1.89	.1441
Regard	23.44	22.85	21.40	22.00	53	2.57	.0645
Environmental Assessment Index							
Mothers' estimate	4.00	3.89	4.15	4.08	51	3.00	.0369
Fathers' estimate	4.15	4.07	4.11	4.00	51	.50	.6841
Home Visitor est.	3.67	3.61	3.75	3.44	25	1.16	.3421

Father's Report of Child-Pet Bond

Relationship Inventory							
Mothers'							
Congruence	21.61	20.82	21.08	20.75	53	.25	.8610
Empathy	18.17	19.40	19.53	18.82	53	.32	.8125
Regard	22.26	22.87	22.80	22.90	52	.39	.7582
Fathers'							
Congruence	20.95	19.91	21.91	18.77	53	2.59	.0630
Empathy	19.95	18.91	17.42	19.08	53	2.72	.0541
Regard	23.44	22.85	21.40	22.00	52	1.75	.1698
Environmental Assessment Index							
Mothers' estimate	4.02	3.97	4.02	4.19	51	1.80	.1596
Fathers' estimate	4.15	4.01	4.11	4.07	51	.57	.6357
Home Visitor est.	3.81	3.73	3.67	3.53	25	1.37	.2798

TABLE 7.

Environmental Assessment Index vs. Child Variables

Pearson Correlations

Child Variables	Home Environment Assessment Estimator: Father	Mother	Home Visitor
Developmental Quot.	.45**	.13	-.12
ISCS - Father ratings			
Cooperation	-.17	.18	-.10
Social Activator	.36	-.08	.09
Hypersensitive	-.41**	-.30*	-.30
Reassurance	-.34*	.03	-.11
Socially Inapt	-.21	-.17	.05
Attentive	.15	-.14	.19
ISCS - Mother ratings			
Social Activator	.31*	.29*	-.11
Hypersensitive	-.13	-.17	-.07
Reassurance	.08	.02	-.12
Uncooperative	.01	-.13	.21
Child's pet bond (CABS)			
Mother's rating	.07	.32*	-.27
Father's rating	-.04	.30	-.32
Home visitor's rating	.70*	.57*	-.32
Pet Attitudes (CASD)			
Child - parental	.13	.10	-.22
Child - home visit	.13	-.14	.11

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$